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A REVIEW OF THE PATTERNS OF ADMISSION AND OUTCOME OF POST-CAESARIAN SECTION PATIENTS IN THE INTENSIVE CARE UNIT OF A TERTIARY HOSPITAL IN NIGERIA.

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ABSTRACT

Despite the increased utilization of invasive monitoring and mechanical ventilation in the care of the obstetric patient, a dedicated intensive care unit (ICU) for this group of patients is almost lacking in the developing world. Critical care for the obstetric patient has been recognized as a useful tool in the reduction of maternal morbidity and mortality.

We sought to review the clinical characteristics and outcome of all post-Caesarean section(C/S) patients admitted into a multi-disciplinary ICU over a 10 year period. Parameters evaluated were indications for C/S, duration of stay, mechanical ventilation and ICU outcome.

114 post-C/S patients were admitted into the ICU during the study period, constituting 9.8% of all admission into the ICU. Emergency C/S constituted 92.2% of all C/Ss and eclampsia represented the commonest indication of C/S requiring care in the ICU. Mortality rate was 23.2% and non post-C/S patients were twice more likely to die in the ICU. Majority of these patients had a short ICU stay, 1-2 days and 19.3% required mechanical ventilation.

Obstetric critical care is evolving and increasing proportion of obstetric patients utilized ICU care in our environment. A dedicated ICU for the obstetric patients will afford more of this special group intensive care with improved maternal health.

INTRODUCTION

There is an increased utilization of intensive care, invasive monitoring and mechanical ventilation in the care of critical obstetric patients in order to improve outcome.[1-3] However, the care of the obstetric patients presents a unique challenge to the critical care physician. This is due to the unique effect of physiological changes of pregnancy and its impact on the postoperative course of the obstetric patients. Therefore, successful maternal and neonatal outcomes for patients admitted to a critical care facility are largely dependent on a multidisciplinary approach requiring input from critical care personnel, obstetricians, anaesthetists, neonatologists and midwives.

Critical Care for the obstetric patient has been observed to be a useful tool in the reduction of maternal morbidity and mortality.[4,5] It has been reported that 10% of women who had C/S would

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require special care in the postoperative period in a high dependency unit (HDU). 3.5% of which were transferred to the ICU[1]. In a case control study which examined the risk factors for ICU admission during delivery in the US, women who had C/S were about 9 times more likely to be admitted in the ICU than those who had vaginal delivery[6](OR=9.0, 95%CI=7.24 to 11.16). The effect of C/S and the indication for C/S was not differentiated as regards the need for ICU admission.

In the developing world, obstetric critical care is just evolving and is different from what obtains in the developed countries.[7] Different scoring systems used to predict outcome of the obstetric patients in the ICU have been developed in the developed world without input from third world countries. One reasons adduced for this is the lack of dedicated obstetric ICU in this part of the world[8,9]. Although the obstetric population represents only a small proportion of those that utilize critical care, this population is an important and growing group. It is therefore expected that the provision of an ICU dedicated for the care of the obstetric will improve the care of this group of patients.

Thus we decided to examine and document the clinical characteristics and outcome of all obstetric patient (post-C/S) admitted to the intensive care unit(ICU)with regard to the frequency and indication of ICU admission, the indication for C/S, the course of management in ICU and maternal mortality.

METHODS

This was a retrospective case-control review of all post-C/S patients admitted to the intensive care unit of The University of Benin Teaching Hospital, between June 2002 and July 2013. The patients' case files and ICU records were extracted and reviewed.

The data collected included the patients' demographics, indications for C/S, duration of stay in ICU, mechanical ventilation, blood transfusion and ICU outcome. A patient before and after matched for sex was selected to serve as controls.

Continuous data were expressed as the mean and standard deviation (SD) and were compared using the t test. Categorical data were expressed as percentages and compared using the chi-square test. A univariate analysis was performed to examine the association with ICU mortality. Analysis was performed using SPSS version 20.0 and statistical significance was defined as a *P* value of less than 0.05.

RESULTS

A total of 114 post-C/S patients were admitted into the ICU of University of Benin Teaching Hospital from June 2002 and July 2013. This represented 6.9% of the total ICU admissions within the period under review. The age of these patients reveal that patients aged 26-30 years and 31-35 years accounted for the majority, 35.1% and 24.6% respectively. Table I

The indication for C/S is as shown in table II. Eclampsia (54.3%) represented the most common indication for C/S among patients admitted into the ICU. This was followed by obstructed labour representing 17.9%. Post-partum haemorrhage accounted for 6.3%, foetal distress 8.4% previous C/S and unfavourable cervix represent 4.2% and 2.1% respectively.

The mortality rate among post-C/S patients within the study period was 23.2%, while the mortality rate in the control group was 38.9% (p value 0.019, OR=2.1168, 95%CI=1.127 to 3.9758) This shows that non post-C/S patients admitted in the ICU are twice more likely to die

compared to their post-C/S counterparts. Table III and Fig II

Table IV represents the duration of stay in the ICU among this group of patients. Majority of post-C/S patients stayed in the unit between 1-2 days. Twenty-seven patients (23.7%) were in the unit between 3-4 days. Only ten (10) post C/S patients stayed more than seven days compared to thirty (30) non post-C/S patients (P value<0.001). Post-C/S patients spend shorter period in the ICU.

Majority (92.2%) of the patients admitted in the ICU during this period had emergency C/S as against 7.8% who had elective operative delivery. Forty six (40.4%) post-C/S patients admitted into the ICU had blood transfusion while 68(59.6%) did not. P value=0.727.

In addition, 22(19.3%) post C/S patients were mechanically ventilated in the ICU, with almost equal number (23) patients in the control. Fig I

Table I: *Socio-Demographic Characteristics Of Patients*

Age	Frequency	Percentage
<20	**4**	**4.2**
20-25	**16**	**16.8**
26-30	**35**	**36.8**
31-35	**27**	**28.4**
36-40	**11**	**11.6**
>40	**7**	**7.3**

Table II: *Indications for C/S*

Indications	Frequency	Percentage
Eclampsia	50	54.3
Obstructed labour	17	17.9
Foetal distress	8	8.4
Previous C/S	4	4.2
Unfavourable C/S	2	2.1
Postpartum haemorrhage	6	6.3
Others	10	10.5

Table II I: *Mortality of C/S vs. mortality of non -C/S*

	Alive	Dead	Total
C/S	73	22	95
Non-C/S	58	37	95
Total	**131**	**59**	**190**

P=0.019 OR=2.1168 95%CI=1.127 to 3.9758

Table IV: *Duration of ICU stay*

	>7 days	<7 days	Total
C/S patients	**8**	**87**	**95**
Non-C/S patients	**30**	**65**	**95**
Total	**38**	**152**	**190**

P<0.0001

Figure I: *Frequency of C/S patients who had mechanical ventilation*

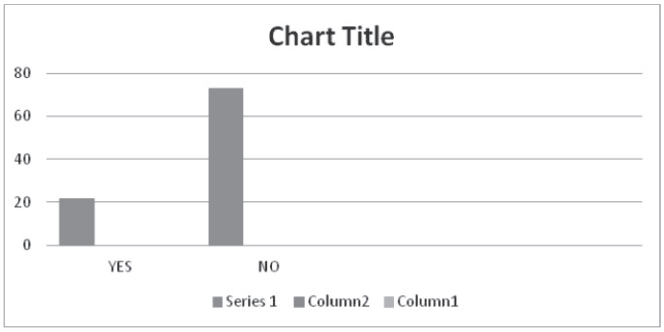
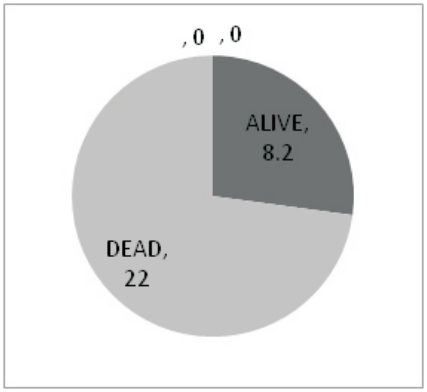


Figure II: *Outcome of C/S patients in ICU*



DISCUSSION

Obstetric patients made up 6.9% of ICU admissions in this study. A prospective analysis of obstetric care in a dedicated obstetric ICU in India observed ICU utilization ratio of 0.14%, only 24 admissions out of 16,756 deliveries[9]. In their study, the authors considered ICU utilization in comparisons to total deliveries whether vaginal or Caeserean. In another similar study at the University College hospital, Ibadan, Nigeria, 1.4% of all deliveries were admitted to the ICU[8]. Our study differs from the above studies because we considered ICU utilization in terms of the number of post-C/S patients in relation to the total number of patients admitted in the unit within the study period.

This study revealed that eclampsia represented the most common indication for C/S among patients admitted into the ICU. Previous studies[6,7,8] have shown that hypertensive disease in pregnancy accounted for the majority of ICU admission post C/S. Some of the reasons for this finding could be attributable to the course of the disease. Most eclamptic patients scheduled for C/S have difficult-to-control blood pressure, seizures and are sometimes unconscious. Most often, these necessitate admission into the intensive care unit with the need for airway control, invasive blood pressure monitoring and ventilatory support. In the study by Demirkan[7], post partum haemorrhage (PPH) was the second most common indication for ICU admission. In this study, PPH accounted for only 6.1% of our admissions.

The mortality rate among post-C/S patients admitted into the ICU within the study period was 23.2%. This figure is higher than in some previous studies. Vasquez and colleagues reported a mortality rate of 11% while Demirkan et al[7] reported 10.4%. Although non post-C/S patients admitted in our ICU were twice more likely to die compared to their post-C/S counterparts, the reported mortality is outside acceptable limit. Osinaike et al[8] reported a higher mortality of 50%. Late presentation to the hospital, lack of dedicated obstetric ICU and institutional factors could be some of the reasons for our findings. Considering the fact that majority of obstetric patients do not have co-morbidities, the need to improve the care of the critically ill obstetric patients becomes imperative.

Only 19.2% post C/S patients were mechanically ventilated in the ICU. This is far lesser than the percentage of patients who were mechanically ventilated in a previous study. Gupta and co-workers[10] reported that 70.8% of their obstetric patients admitted into the ICU had ventilator support. Out of this number, only 8 patients survived. Initiating ventilatory support for the obstetric patient requires a thorough understanding of the physiological changes of pregnancy. Oestrogen mediated airway oedema is a major challenge during endotrachael intubation and requires the presence of an experienced anaesthetists. In addition, the use of smaller sized endotracheal tubes[10] increases airway resistance which needs a higher air pressure to overcome during mechanical

ventilation. Tracheostomy may be required during prolonged intubation and this may be difficult due to airway oedema and increased breast size. It is also associated with a greater blood loss due to increased vascularity of the airway[11].

Majority of post-C/S patients had a short stay in the ICU. Gupta et al[9] observed a mean duration of ICU stay of 39.42 ± 33.7 hours with survivors having longer duration of stay then non-survivors. Previously, prolonged ICU stay for obstetric patients, defined as more 3 days stay was associated with irregular antenatal care, ionotropic support and blood purification[12]. Most obstetric patients are young and free of co-morbidities and the reason for ICU admission had to do with complications of pregnancy. Once these complications are treated, they could be discharged to the ward. In addition, the observed short stay of these patients means among other things the cost effectiveness of admission of obstetric patients in the ICU. In addition, these patients are spared the common complications of prolonged ICU stay.

Patients who had emergency C/S accounted for 92.2% of the patients admitted in the ICU during this period. This is to be expected considering the indications for the abdominal deliveries in the first place. In addition, poor antenatal care and low socioeconomic status are some of the reasons for complications following pregnancy[9] and thus emergency surgeries. We did not however consider antenatal care and socioeconomic status in this study as our primary objective was to evaluate the characteristics and outcome of post-c/s admitted in the ICU.

Although Caesarian section has been identified as a common indication for blood transfusion in obstetric practice due to the risk for massive blood loss[13], we observed that more than half of our patients were not transfused while in the ICU. The reason for this finding may be difficult to extrapolate. One of the reasons is because, we did not consider intra-operative event vis-a vis blood loss and transfusion at surgery. In addition, it was noted that PPH accounted for the indication for C/S in just a few of these patients. Previously, Imarengiaye and colleague[14] had identified factors associated with transfusion at cesarean section as lack of prenatal care, grand multiparity, previous cesarean section, and pregnancies complicated by placenta previa.

CONCLUSION

Obstetric critical care is evolving and increasing proportion of obstetric patients utilized ICU care in our environment. A dedicated obstetric ICU is urgently advocated for in order to cater for this special group of patients for improved maternal health.

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